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DISTRIBUTION OF THE INDIAN MACKEREL, *RASTRELLIGER KANAGURTA* (CUVIER) ALONG THE COASTS OF INDIA IN 1979 AND 1980*

Introduction

Mechanisation of the exploitation of the pelagic fishery resource in the country is slowly setting in. It is imperative in such a situation to identify areas and seasons of abundance of the resource to plan economic and judicious dispensation of the effort required to exploit them. Areas of good catches and times of abundance of the Indian mackerel, *Rastrelliger kanagurta* (Cuvier) along the Indian coasts for the year 1979 and 1980 are presented here, as an addition to the data for 1978 already published (*Mar. Fish. Infor. Ser. T & E Ser.*, No. 8: 1-11, 1979).

Annual production

The total landings of the mackerel in India from its pinnacle of 2,04,575 tonnes in 1971, gradually declined in the following 3 years to a poor figure of 37,462 t in 1974, whence except a small dip in 1977 it increased to 85,233 t in 1978. This upward trend subsequently reversed in the following years and the landings decreased to 71,514 t in 1979 and 55,279 t in 1980 (Fig. 1).

Mackerel in relation to total marine fish production

The country recorded 14,03,607 t of marine fish in 1978. Of this, the mackerel formed 6.1%. In 1979, the total marine fish catch in India was 13,88,380 t of which the contribution by the mackerel was 5.2%. The total marine fish catch in the country in 1980 was only 12,49,837 t, 4.4% of which being mackerel (Fig. 1).

Mackerel landings in the east and west coast of India

The landings in the east coast down to Kanyakumari in 1978 was 4,049 t forming 4.8% of the all-India total. In the west coast from Kanyakumari up, the landings were 81,184 t forming 95.2% of the year's total. In 1979, the catch and the corresponding percentage in the east and west coasts were 6,129 t forming 8.6% and 65,385 t forming 91.4%. In the subsequent year, the catch and its percentage in the east coast have increased further to 13,187 t and 23.9% respectively. In the west coast the catch concurrently reduced to 42,092 t forming only 76.1% (Fig. 1). When the landings and their percentages significantly increased during 1978-80 period in the east coast, in the west coast it greatly dwindled.

Distribution of the mackerel along the states of India

West Bengal

As in 1978, there was no mackerel landing along this coast during 1979 and 1980 also.

Orissa

The mackerel catch in Orissa in 1978 was 196 t, forming only 0.2% in the country's total landings. It, however, formed 0.5% in the state's annual marine fish catch. In 1979, the mackerel landings in the state increased to 306 t (Fig. 1). In the country's total mackerel production of the year the state's share was 0.4%. In the total marine fish landings of the state in the year, the mackerel contributed to 0.6%. Subsequently, there was a decline in the mackerel catch in 1980, dropping the landings to 265 t. However, in the country's total mackerel catch for the year it formed 0.5%, and in the state's marine fish landings it accounted for 0.7%. In spite of the reduction in the catch, the percentage of the mackerel in 1980 at both levels showed improvements (Fig. 1).

Within the state, as in 1978, no mackerel occurred along the coast of Balasore district in the north (Fig. 2 - or 1) in 1979 and 1980 also. In 1978, high catches accounting for 55.5% of the state's total occurred in Puri and northern part of Ganjam coasts. The southern area of Ganjam coast accounted for the remaining 44.5%. In 1979, the southern coasts of Ganjam district (Fig. 2 - or 3) accounted for 74.5% of the mackerel catch. Puri and northern coasts of Ganjam district (Fig. 2 - or 2) had the rest. In 1980, again more or less the 1978 condition existed with 58.9% of the landings occurring along the coasts of Puri and northern part of Ganjam district and only 41.1% occurring along the coast of the southern part of Ganjam district.

Andhra Pradesh

The mackerel landings in this state in 1979 and 1980 were 2,621 t and 6,203 t respectively (Fig. 1) against 2,520 t of 1978. There was thus an increase of about 2.4 times in the landings in 1980 over that of the preceeding 2 years. The percentages of the mackerel landings of the state in the country's total in

*Prepared by A. Noble, in association with the staff of Fishery Resources Assessment Division.

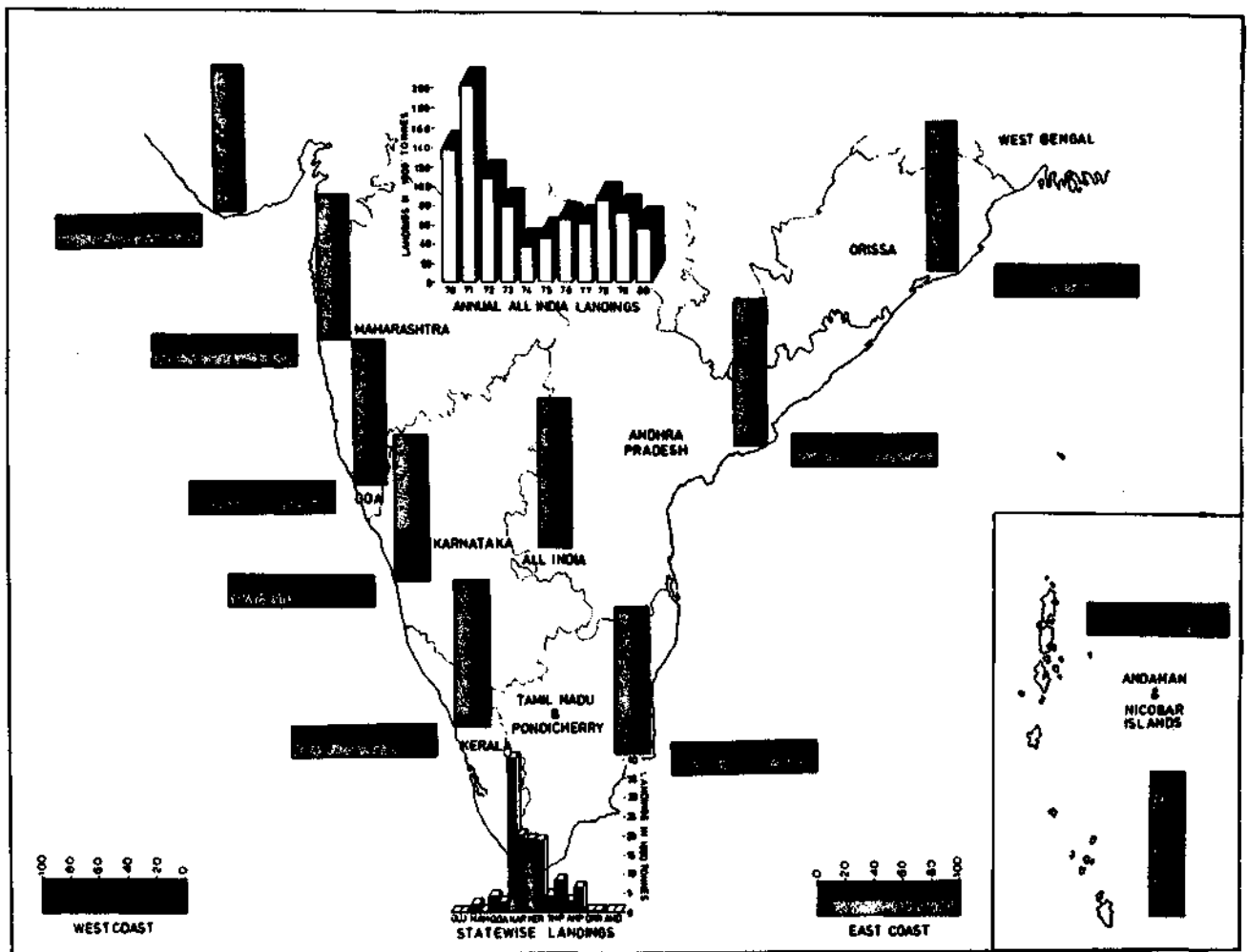


Fig. 1. All India annual landings of mackerel during 1970-80, statewise landings in 1979 and 1980, statewise and coastwise percentage landings of mackerel in the all India total (horizontal bars), and percentage of mackerel in the marine fish production (vertical bars). The stippled bars stand for 1979 and the striated for 1980.

1978 and 1979 were 3.0 and 3.7 respectively. The increase in the landings here in 1980 was so substantial as to register a high value of 11.4% in the all-India annual catch. In the state's marine fish landings, the mackerel formed 3.1%, 2.9% and 5.3% in 1978, 1979 and 1980 respectively (Fig. 1).

There was no mackerel catch along the Srikakulam coast in the northern most part of the state in 1978. In 1979 and 1980, respectively 27.8% and 29.1% of the mackerel landed in the state, came from this area (Fig. 2 - Anp. 1 & 2). In fact, the increasing trend seen in the catches along the southern Orissa coast reached a climax in the Srikakulam coast followed by a little fall along the Visakhapatnam coast (Fig. 2 Anp. 3). The Kakinada coast in East Godavari district (Fig. 2 Anp. 4) had the peak landings accounting for 46.0%, 53.4% and 33.0% of the state's total in 1978, 1979 and 1980 respectively. In fact, three-fourth (77.8%) of the mackerel landings in 1979 occurred in the northern

half of Andhra Pradesh stretching from Srikakulam to East Godavari coast. The landing in the southern half was 47.8% in 1978. It, however, reduced to just 22.2% in 1979, and 34.2% in 1980. In the southern half of Andhra Pradesh, the important place for mackerel landings was the Guntur-Prakasam area (Fig. 2 - Anp. 7).

In 1978, mackerel in the state actually occurred in 2 clusters of places, the first one along the coasts of Visakhapatnam and Godavari districts and the second along the coasts of Guntur, Prakasam and Nellore. In 1979 and 1980, there were 3 areas along the coast where the mackerel catches were comparatively good namely, the northern most part of Srikakulam district, the East Godavari district, and the Guntur - Prakasam districts. Along the coasts of Visakhapatnam (Fig. 2 - Anp. 3), West Godavari - Krishna (Fig. 2 - Anp. 5 & 6) and Nellore (Fig. 2 - Anp. 8 & 9) districts the mackerel catches were poor

in 1979 and 1980.

Tamil Nadu and Pondicherry

The mackerel catch here was 1,632 t in 1978. In 1979, the catch increased to 3,945 t and in 1980 it further rose to 7,674 t (Fig. 1). As in Andhra Pradesh, there was an increasing trend in the mackerel landings along Tamil Nadu-Pondicherry coast also.

The percentage landings of the mackerel in the coast in respective all-India annual total mackerel landings were 1.9 in 1978, 5.5 in 1979 and 14.1 in 1980 (Fig. 1). In the state's total marine fish catches, the mackerel landings formed 0.7% in 1978, 1.6% in 1979 and 3.4% in 1980 (Fig. 1).

Immediately after the poor mackerel zone of Nellore coast in Andhra Pradesh (Fig. 2 - Anp. 9), the catch in Tamil Nadu coast in the northern most part of Chengalpattu district (Fig. 2 - Tnp. 1) was slightly better. After a small drop along the rest of the coast of this district (Fig. 2 - Anp. 2 to 4) the catch was comparatively good in the South Arcot and Pondicherry area (Fig. 2 - Tnp. 5). The landings in Thanjavur-Pudukottai area (Fig. 2 - Tnp. 9) in 1980 were very high (26.3%). In 1978 also, the area from South Arcot to Thanjavur districts accounted for 47.0% of the total mackerel landings of the Tamil Nadu - Pondicherry coast.

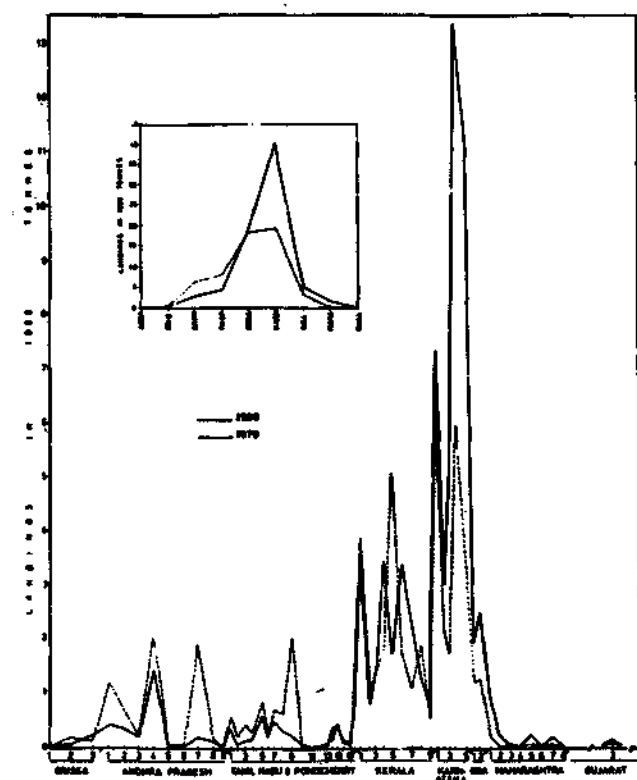


Fig. 2. Distribution of mackerel landings within the states in 1979 and 1980.

Next area of good mackerel landings in the coast of Tamil Nadu was from the south end of Ramanathapuram to Kanyakumari districts contributing to 42.0% of the State's annual landings in 1978. In 1979 and 1980, Thirunelveli coast (Fig. 2 - Tnp. 14 & 15) had better catches in comparison to the Ramanathapuram coast (Fig. 2 - Tnp. 10 to 13) where the catches were very poor. All through the Tamil Nadu - Pondicherry coast from Chengalpattu district in the north to Thanjavur district in the south (Fig. 2 - Tnp. 1 to 9) the catches in 1980 were better than that of 1979. Along Ramanathapuram and Tirunelveli coasts (Fig. 2 - Tnp. 10 to 15) the 1979 catches were almost the same to that of 1980.

Kerala

In contrast to the ascend in the landings along the east coast, in the west coast beginning with Kerala State in the south, the landings descended during 1978-80 period.

The mackerel catch in Kerala State was 25,917 t in 1978, declining to 18,585 t in 1979 and 18,474 t in 1980 (Fig. 1).

The mackerel landings in Kerala in 1978 formed 30.4% of the all-India catch. In the following year it reduced to 26.0% but regained to a good position with 34.0% in 1980 (Fig. 1). In the state's total marine fish landings, the mackerel contributed to 7.0% in 1978, 5.6% in 1979 and 6.6% in 1980 (Fig. 1).

Within the state, the southern most part of Trivandrum coast (Fig. 2 - Ke. 1) had some amount of mackerel in all the years under review here. In 1978, even though it accounted only for 4.4% of the state's mackerel landings, it elevated to 18.9% in 1979 and 20.8% in 1980, similar to the trend seen in the east coast of the country. In 1980, in the northern coast of Trivandrum district and some contiguous portions of Quilon district (Fig. 2 - Ke. 2) the landings were poor. Along the coasts of Alleppey district to the southern part of Cannanore district (Fig. 2 - Ke. 3 to 8) the catches were comparatively high. On account of the operations of purse seiners in and around the coast of Ernakulam district (Fig. 2 - Ke. 5) there were exceptionally good landings at Cochin Fisheries Harbour. The Alleppey - Ernakulam - Trichur (Fig. 2 - Ke. 5) region thus had better catches than the Malapuram - Kozhikode - Cannanore area (Fig. 2 - Ke. 7 & 8) in 1980. In 1979, the Alleppey - Ernakulam - Trichur region had only lower landings. But the landings in Trichur - Malapuram section (Fig. 2 - Ke. 6) were very high. In the northern part of the state, along Cannanore coast (Fig. 2 - Ke. 9) the catch was low in 1979 and 1980. However, the mackerel was abundant along the Malabar coast of Malapuram - Cannanore districts (Fig. 2 - Ke. 7 to 9) in 1979, where 62.0% of the sta-

te's mackerel landings were accounted for.

Karnataka

Maximum mackerel landings of the country in 1978 came from this state, and it amounted to 50,704 t accounting for 59.5% of the total annual all-India catch. In 1979, the landings reduced to 40,084 t, yet contributing to the bulk (56.1%) of the total of the country. The landings subsequently crashed to a low level of 19,634 t in 1980, forming only 35.5% in the all-India catch for the year (Fig. 1). Thus the declining trend seen along the Kerala coast was reflected much more conspicuously in Karnataka during 1978-80 period.

The mackerel fishery is very important to the Karnataka state where it forms a sizable chunk in its total marine fish production. In 1978, the mackerel formed 33.2% in the state's total marine fish landings. In 1979, this percentage diminished to 31.7, and in 1980 it lowered further to 17.5 (Fig. 1).

In and around Mangalore (Fig. 2 - Ka. 1) the catches were good during 1978-80 period. North of Mangalore from Mulki to Kidiyoor (Fig. 2 - Ka. 2) the catch generally was low. The landings from Malpe to Coondapur (Fig. 2 - Ka. 3) in 1978 were very high, to the extent that it alone formed 32.4% in the state's annual total landings of the mackerel. In the following 2 years the landings here were lesser. Though it was better in comparison to the Mulki - Kidiyoor area in 1979, in 1980 it was poorer. Towards north, from Gangoli to Sasithal, the catches in 1978 were poor. However, in 1979, the catch in this area (Fig. 2 - Ka. 4) was very high forming 33.5% of the state's total. In 1980 also this region topped in the landings with 30.4% on its side. From Bhatkal to the north, the catches formed only 16.7% in 1978, increasing to 27.9% in 1979 and dropping to 18.8% in 1980 (Fig. 2 - Ka. 5).

The share of Dakshina Karnataka coast in the state's mackerel landings in 1978 was about 80.0%, the remaining 20.0% being from the coast of Uttara Karnataka. In 1979, and 1980, the catches in Dakshina Karnataka were respectively to the tune of 72.0% and 80.0% of the state's total landings, the rest being fished from Uttara Karnataka.

Purse seine operations along the coast of the state were rather wide spread especially from the bases at Mangalore, Malpe, Gangoli, Bhatkal and Karwar, with the traditional gear *Rampani* still in vogue.

Goa

The mackerel landings in Goa in 1978, 1979 and 1980 were 3,371 t, 4,391 t and 2,446 t forming 4.0%, 6.2% and 4.5% respectively in the respective annual

total mackerel landings of the country as a whole (Fig. 1). In the territory's total marine fish landings, the mackerel formed 12.4% in 1978, 17.3% in 1979 and 10.0% in 1980 (Fig. 1).

The bulk of the catch in the territory came from its northern sector in 1978. In 1979 and 1980, the catch was more or less uniformly spread out, though in the northern region, it was slightly better (Fig. 2 - G. 1 & 2).

Purse seine continued to be the major gear operated along the coast from base at Panaji.

Maharashtra

The mackerel catch in Maharashtra state was 787 t in 1978. It increased to 1,455 t in 1979 but declined to a very low value of 288 t in the year next. In these 3 years, the mackerel landings in the state formed respectively 0.9%, 2.0% and 0.5% in the all-India total mackerel landings of the corresponding years (Fig. 1). In the marine fish landings of the state, the mackerel formed only 0.3% in 1978, 0.5% in 1979 and 0.1% in 1980 (Fig. 1).

The Ratnagiri coast (Fig. 2 - Ma. 1 & 2) adjacent to the Union Territory of Goa had 29.0% of the state's total mackerel landings to its credit in 1978. In 1979, this area had 77.0% catch, and in 1980 the percentage increased to 82.0. In 1979 and 1980, there were landings of respectively 13.0% and 14.0% of mackerel in the northern most part of the coast of Ratnagiri district (Fig. 2 - Ma. 5). The landings in Bombay coast in 1978 were 65.0% of the year's total catch. However, it reduced to just about 9.0% in 1979 and dwindled further to 4.0% in 1980 (Fig. 2 - Ma. 7).

Gujarat

There was no mackerel catch along this coast in 1978. However, 35 t of mackerel were landed in the state in 1979. (Fig. 1) along the Bhavanagar - Porbandar area (Fig. 2 - Gu. 3). In 1980, 112 t of mackerel were caught from this area.

The mackerel catch in Gujarat formed only 0.2% in the country's total mackerel production in 1980. In the state's marine fish catch it contributed to only 0.06%. In 1979, the landings were so poor in quantity as to register any significant percentage.

Andaman and Nicobar Islands

The mackerel catch in this area was 106 t in 1978. It reduced to 92 t in 1979 but increased to 112 t in 1980 (Fig. 1).

In 1978 and 1979, the landings formed only 0.1% of the annual totals in the country. In 1980, however, it increased to 3.0%. In the island's marine fish lan-

dings, the mackerel played an important role as it formed 6.7%, 5.3% and 10.2% respectively in the three years.

Lakshadweep

As usual there were no mackerel landings in these islands during the years under consideration.

Seasonal distribution of the mackerel

The season of 1978 which had the highest landings in September (26.2%) and October (28.7%) continued up to May 1979. During January - May 1979, the percentages of the monthly catch ranged between 5.4 in February and 11.0 in April (Fig. 3). In June the percentage fell to 2.9 and reached 0.4 in August. In September, with the commencement of 1979 season, the percentage rose to 9.9. In the subsequent 2 months, the monthly percentage landings were 19.9

and 16.2 respectively. Further it again reduced to 5.1% in December. In 1980 (Fig. 3), during January - March the monthly percentages ranged between 7.5 of February and 10.0 of January. After a fall in April (4.4%) it again rose to 11.5% in May 1980. As in the previous year the catch fell in June to 2.4% and reduced further to 1.2% by August. The mackerel season for the year 1980 commenced in September with 14.3% of the year's total landings and remained more or less the same in magnitude for the rest of the year within a range of 10.7% to 14.9% per month. In fact, December had the highest percentage (14.9) for 1980.

As the bulk of the landings occur along the west coast of India, the seasonal distribution on all-India level is only a reflection of what is happening in the west coast (Fig. 3).

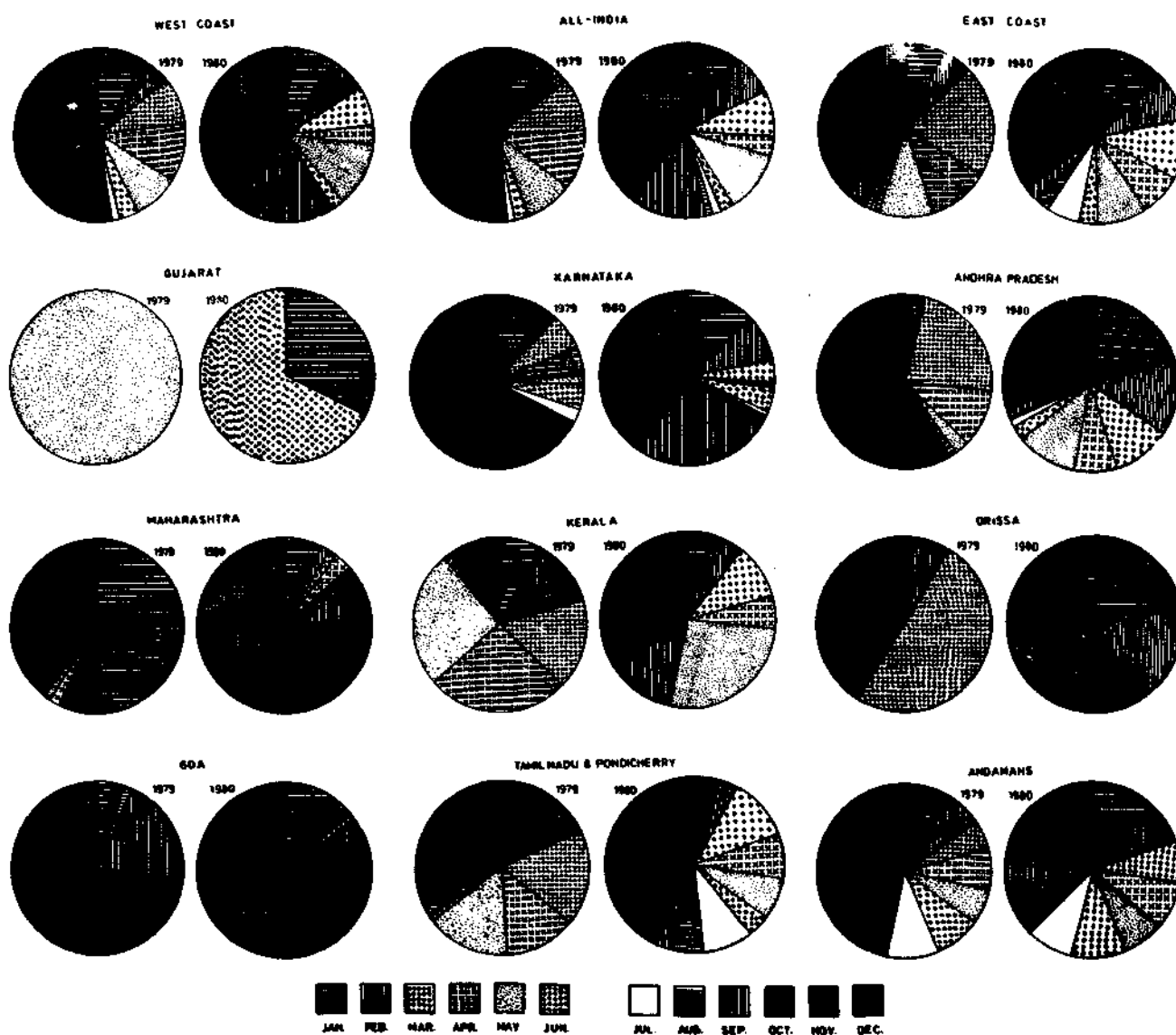


Fig. 3. All India, statewise and coastwise seasonal distribution of the mackerel landings in 1979 and 1980.

The picture in the east coast (Fig. 3), nevertheless, is quite different. In 1978, the maximum landings along the east coast occurred in February (34.5%) and March (29.9%). In 1979 (Fig. 3), it was the highest in March (20.7%) and more or less good in the following 2 months registering respectively 11.8% and 10.0% of total landings. As in the west coast, the landings in June - August were very low (0.8-1.2%) in the east coast also. In October - December 1979, the catches were better, the monthly percentages, ranging from 9.0 to 16.8. The percentage in December was the highest. Subsequently in 1980 up to May, the catches were only moderate with 8.1% to 12.9% range in monthly values. This was followed by low values during June - September (2.9-6.1%). As in the west coast the catch was important here in October in this year with the percentage at 14.3. After a lull in November (5.5%), the landing went up to 16.0% in December which incidentally is the year's peak month in mackerel landings along this coast.

Statewise seasonal distribution in the mackerel landings

Orissa

In 1978 the maximum landings in the state occurred in February (35.3%) and March (23.1%). There was a secondary peak in November (17.3%). In the next year the major peak occurred in March when 50.3% of the state's catches were landed (Fig. 3). As in the previous year, the secondary peak occurred in November (22.6%). This was more or less the story of the southern coast of Ganjam district (Fig. 4 - Or. 3) from where the state's major mackerel contributions came. Deviating from this pattern, the landings in January and February 1980 were respectively only 21.9% and 18.5% having the peak shifted to December when 55.5% of the year's catch were recorded. It was a projection of the bulk landings in the north along Puri and northern coast of Ganjam districts (Fig. 4 - Or. 2).

The mackerel was absent in the state during May - September in 1978 and April - July in 1979. In the next year it was practically nil during March to September period (Fig. 4 - Or. 1 to 3).

Andhra Pradesh

The bulk of the landings in 1978 occurred here in February (52.1%) and March (42.5%). There was no mackerel catch in May and June and it was extremely poor for the rest of the year with the percentages ranging between 0.2 to 2.0. In 1979 (Fig. 3), the catch was good in March when 22.6% of the fish in the year were landed. Subsequently during June - August, the fishery was practically absent. In November and December, the catches again shot up to respectively 22.1% and 24.7%. This tempo was carried over to

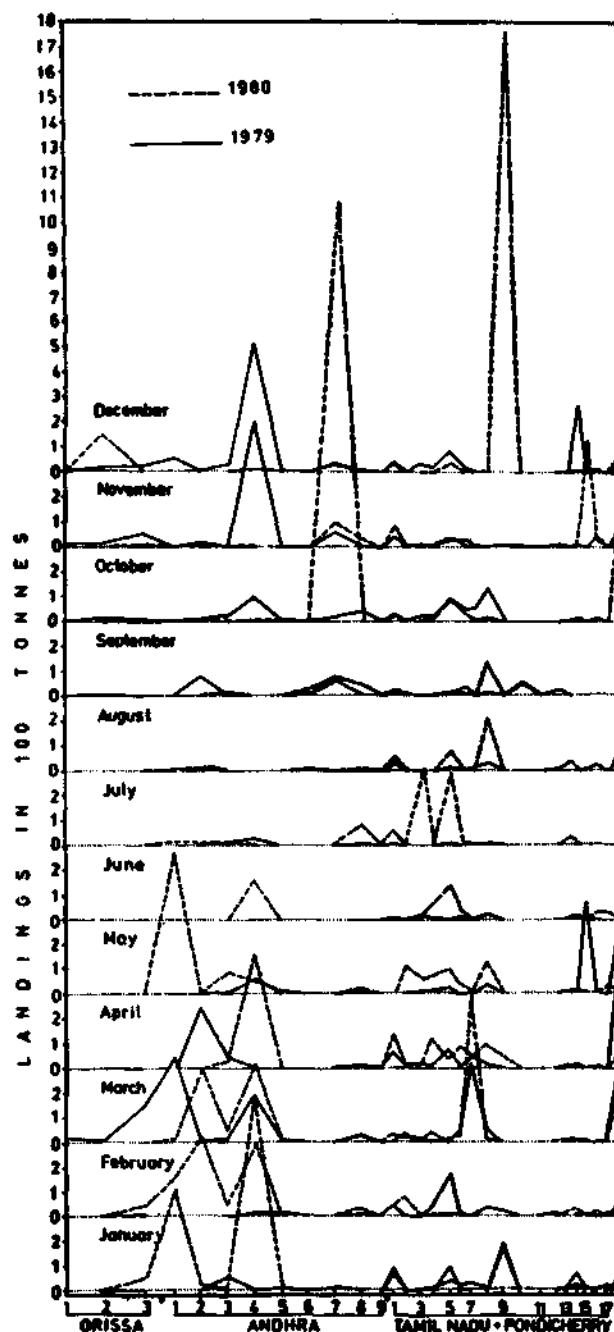


Fig. 4. Seasonal distribution of mackerel landings within Orissa, Andhra Pradesh and Tamil Nadu-Pondicherry states in 1979 and 1980.

January 1980 (Fig. 3) when 19.7% of the year's landings were accounted for. Subsequently the landings up to May was appreciably good in quantities resulting in the monthly percentages to range between 7.9 to 13.2. The catch was the highest in the year in October with 27.2%. Unlike the previous years, the mackerel landings were much less in the state during June - September also. The peak landing in October 1980 was due to an unusually high catch in the Guntur - Prakasam area (Fig. 4 - Anp. 7).

The fishery was good in the state from the coast of Srikakulam district in the north to East Godavari coast (Fig. 4 - Anp. 1 to 4) during January - May and in the remaining southern part of the state (Fig. 4 - Anp. 6 to 8) it was important during September - December.

Tamil Nadu and Pondicherry

The mackerel landings in Tamil Nadu - Pondicherry coast ranged in January - April between 10.9% to 15.4% of the annual total catch in 1978. The highest percentage during this period occurred in April. The percentages were 4.1 and 11.0 in May and June respectively. The catches were low during July - September with the monthly percentages ranging between 1.8 and 4.8. In October, the catch became 7.7% in the annual total, followed by 4.9% in November and 8.7% in December. In 1979, the bulk of the mackerel catch along the coast was accounted for in March with 17.6% of the fish (Fig. 3). In April and May, the landings had fallen to 13.3% and 15.8% respectively. During June - September the catches were very low, the percentages lying between 0.2 and 2.8. In October, the landings accounted for 10.5%, followed by 6.2% in November and 12.3% in December. In the beginning of the year also the landings were more or less of this order, apportioned as 10.5% to January and 7.8% to February. In January and February 1980 (Fig. 3), the percentage landings in Tamil Nadu - Pondicherry coast were 5.6 and 3.4 respectively to the year's total. During March - May the catches improved a little, ranging between 7.1 and 11.3. During June - November period the catches varied between 3.1% to 9.4%. December 1980 had the maximum landings to the tune of 25.5% of the annual total.

In Tamil Nadu - Pondicherry area, the coast of South Arcot, Pondicherry, Karaikkal and Thanjavur had the highest catch in June 1978. It was good in February - March and also October. Along the coasts of Tirunelveli and Kanyakumari districts, the season occurred during December - April, with the maximum in April. In 1979, the catch along the South Arcot, Pondicherry, Karaikkal and Thanjavur area (Fig. 4 - Tnp. 5 to 7) was the highest in March and good in October. Along Tirunelveli and Kanyakumari coasts (Fig. 4 - Tnp. 13 to 18) the catches were good in March - May. In 1980 also, the catch in general along the South Arcot, Pondicherry, Karaikkal and Thanjavur area was the highest in March. Along Tirunelveli and Kanyakumari coasts the mackerel landings were good during October and November. Because of unusually heavy mackerel catches, in Thanjavur - Pudukottai region (Fig. 4 - Tnp. 9) the landings registered substantial increase in December.

Kerala

The peak landings occurred in this state in September forming 33.1% of the annual total catch in 1978. In October, the landing was good (15.0%). During January - April, the catches were moderate except in March when 12.3% of the year's total were caught. The landings were meagre during July - August. In 1979 (Fig. 3), the fishery that continued from the previous year heading to the peak in April (26.4%) and an equally important catch in May (25.7%). After the usual off-season during June - August, the landings remained low during September -

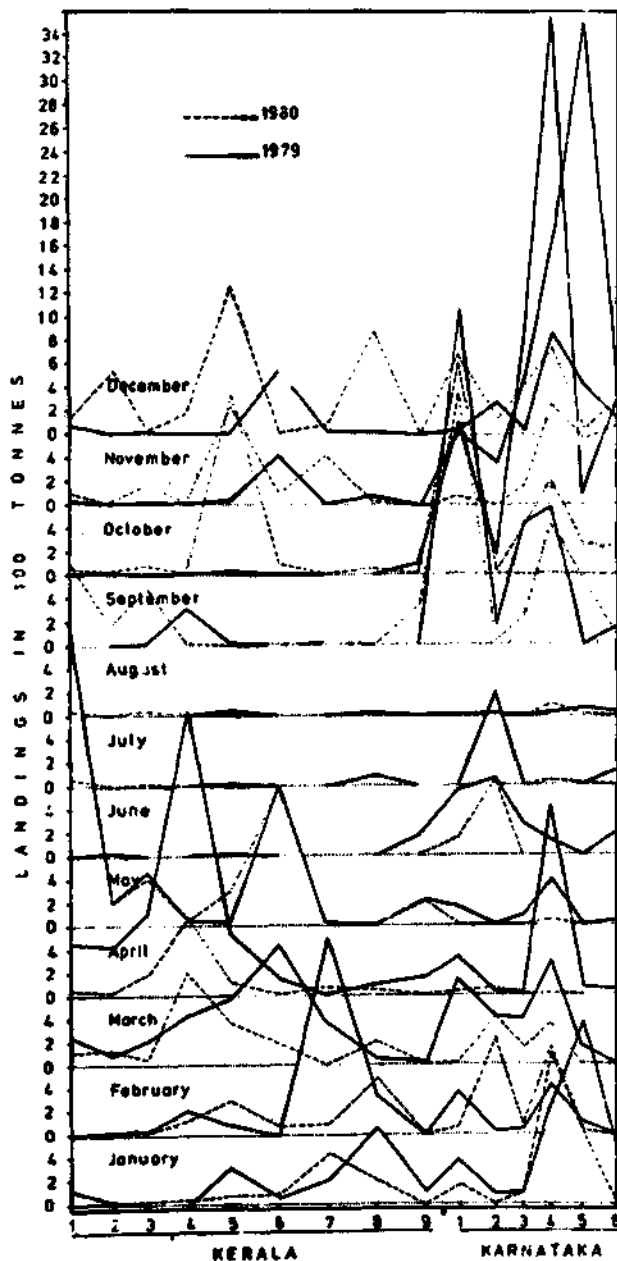


Fig. 5. Seasonal distribution of mackerel landings within Kerala and Karnataka states in 1979 and 1980.

- December within a monthly range of 0.9% to 3.4% only. This low landings limped through the beginning of 1980 also up to April. In May, there was a sudden spurt in the landings resulting in a high percentage of 26.7 of the annual total landings. Subsequently the fishery was almost absent during June - August. The 1980 season commenced in September when 11.0% of the fish were landed. In October and November the percentage of landings were 9.6 and 8.6 respectively only. But December realised 16.2% of the year's catch (Fig. 3).

In Kerala along the southern most part of Trivandrum coast, the landings were exceptionally high in May in 1979 and 1980 (Fig. 5 - Ke. 1). In 1978 also, the highest landings here were recorded in May. Along the coast of Ernakulam district and nearby areas of neighbouring districts, the fishery was excellent in September and good in February - April in 1978. Along the Malapuram - Kozhikode - Cannanore coast, the season of 1978 started in September with high catches and it was good in October also. The landings in January - March period of the year here were only moderate. The catch as already stated earlier was very high in the southern most part of the Trivandrum coast in May of both 1979 and 1980. Apart from this, in 1979, good catches were noticed along Alleppey coast (Fig. 5 - Ke. 4) in April, Trichur - Malapuram area (Fig. 5 - Ke. 6) in March and May and Malapuram - Kozhikode area (Fig. 5 - Ke. 7) in February. Such high catches were noticed in 1980 only in Trichur - Malapuram area in May, and Ernakulam and the neighbouring areas in October - December. The catch in Kozhikode - Cannanore area (Fig. 5 - Ke. 8) in December is also noteworthy. In short, the Alleppey - Ernakulam - Trichur region (Fig. 5 - Ke. 5) and the Malapuram - Kozhikode - Cannanore region (Fig. 5 - Ke. 7 & 8) showed the same seasonal trends in 1979 and 1980.

Karnataka

In Karnataka, in 1978, the mackerel season of the previous year lingered during January - April period. During May - August the fishery was practically absent. However, the season of 1978 commencing in September with good catches had the highest landings in October when 38.1% of the year's landings were recorded. This fishery as usual extended to the first half of 1979. The season of 1979 in turn started in September and the peak landing occurred in October with 26.0% of the total. In November, the landing was 23.9%. But by December it dwindled to 4.4%. The same story was repeated in 1980 also though the total landings in the state were comparatively much low. The fishery as usual started, in September, and bagged the highest landing (28.1%) of the year. After September, the catches gradually diminished from 13.9%

of October to 11.8% of December.

Mangalore coast in Karnataka had very high landings in October - November in 1978. The landings were high along the other regions of the Dakshina Karnataka coast up to Coondapur during October - December. The highest mackerel landings of the year in the state occurred in October along Malpe - Coondapur region. Along the Uttara Karnataka coast good catches were noticed in September, October and December. In 1979, the landings along Mangalore coast (Fig. 5 - Ka. 1) were good in September and October. Along Malpe - Coondapur region (Fig. 5 - Ka. 3) it was good in September - November. Around Gangoli (Fig. 5 - Ka. 4) there were good landings in April and also September - December. In 1979, the highest catch in the state occurred here in October. Along the coast of Uttara Karnataka (Fig. 5 - Ka. 5 & 6) there were good mackerel catches in January and also October - November. The highest monthly landing in the state in 1980 appeared in Mangalore in September. The landing in the Malpe - Coondapur coast was poor and around Gangoli it was better in January and September.

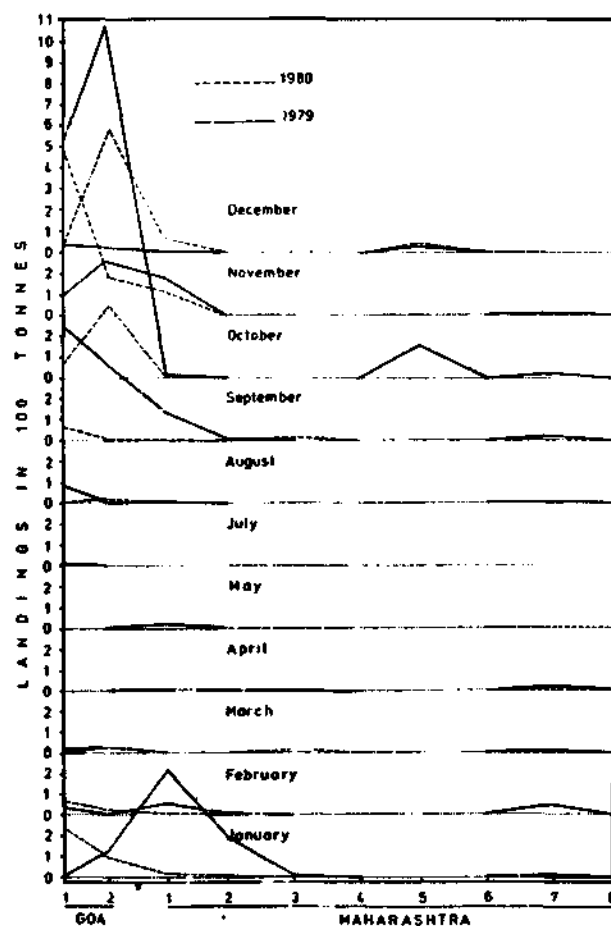


Fig. 6. Seasonal distribution of mackerel landings within the Union Territory of Goa and the state of Maharashtra in 1979 and 1980.

Goa

Good catches of mackerel were recorded here in September - December in 1978 with 32.2% occurring in October and the peak of 34.6% occurring in November. This fishery further continued in a low tone up to March 1979 (Fig. 3). The fish disappeared totally in the following quarter and appeared only sparsely in the next 2 months. The season for 1979 commenced in September and landed 20.6% of the year's total. The highest landings in the year (63.8%), however, occurred in October. During November 1979 to January 1980, the coast had only moderate landings, subsequently becoming poor till March. During April - July, the mackerel as usual was absent. In August - September the mackerel again started appearing and the catches during October - December were good with the peak monthly percentage of 38.6 occurring in November (Fig. 3).

Region-wise (Fig. 6 - Go. 1 & 2) the pattern of seasonal distribution in the mackerel was almost the same as that of the territory as a whole.

Maharashtra

In Maharashtra, although the mackerel landings occurred all through the year in 1978, November recorded the highest landing of 46.8%. In the first half of 1979, the landings occurred up to May and after a break in June - July occurred again in August - December (Fig. 3). The primary peak in the year was in January with 48.8% catch and the secondary peak in October with 13.5%. The landings in November was in par with that of October. In 1980, the mackerel was landed up to May in the first part with a small peak of 7.0% in January. After an absence during July - August, there was a landing of 8.7% of the year's total in September. The fish was absent again in October, but reappeared in November and December holding 39.9% and 36.8% respectively of the annual catch (Fig. 3).

In the state along Ratnagiri coast, the fishery

commenced with high catches in October in 1978. In November also the fishery was good. The arrival of mackerel in Bombay was moderate in September but heavy in November and December. In 1979, the landing was the highest in January along the southern half of the Ratnagiri coast (Fig. 6 - Ma. 1 & 2). As in 1978, good landings occurred in the southern most part of Ratnagiri coast (Fig. 6 - Ma. 1) in November - December 1980. There was unusually good mackerel landing in the northern most region of Ratnagiri district (Fig. 6 - Ma. 5) in October 1979. In December of 1979 and 1980 also some mackerel were landed here though it was conspicuous by its absence in the same month in 1978.

Gujarat

Gujarat had no mackerel landing in 1978, and what little available in 1979 occurred in the month of May (Fig. 3). In 1980, two-third of the catch occurred in March and the rest in January.

Andaman and Nicobar Islands

A protracted fishery was observed in these waters where the mackerel landings were more or less equally distributed among all the months of the year ranging from 4.7% in September to 11.3% in December in 1978, 5.4% in March to 10.9% in December in 1979, and 6.6% in October to 11.5% in January in 1980.

General remarks

In the southern region of Tamil Nadu state around the peninsular India the mackerel seasons were almost similar to west coast. The South Arcot - Pondicherry - Karaikkal - Thanjavur area, having a protracted season, almost commensurate with that of Andaman and Nicobar Islands, appears to have more or less an intermediate status between the west and east coast in the seasonal distribution of the mackerel fishery in Indian coasts.

